NESDIS Satellite Proving Ground (SPG) Charter (DRAFT)

Overview: Mission and Vision Statements

NESDIS provides environmental products, information and services to promote and protect the Nation's security, environment, economy, and quality of life. NESDIS has stood up a Product Portfolio Management (PPM) group to coordinate the development and implementation of science algorithm projects, ensure effective integration of data from applicable data sources and retirement of old sources. PPM allows for management of product and services from formulation through retirement with an annual update which is reactive to new opportunities and user engagement needs. PPM has two interrelated components that include Products and Services (P&S) and the Satellite Proving Ground (SPG) to maximize user readiness.

The vision of the NESDIS Satellite Proving Ground (SPG) is to maximize the impact of NESDIS products and services to NOAA's broader Mission Service Areas and stakeholders, supporting: earth system prediction; environmental stewardship; climate monitoring; and social justice. The SPG mission is to demonstrate the impact of NESDIS product and services to NOAA's climate, weather-ready nation, healthy oceans, resilient coastal communities and emerging missions focusing on authoritative outcomes for driving research and operational user needs

To accomplish both vision and mission, the NESDIS SPG has established three key goals and objectives:

GOAL 1: Enhance NOAA's Weather, Water, Climate, Oceans and Ecosystem missions through improved use of satellite data and products

> **Objective 1.1:** Assess value and impact (fit for purpose) of NESDIS products to NOAA mission, understand user readiness and identify opportunities to address shortfalls and emerging needs
> **Objective 1.2:** Enhance NOAA services through collaborative development of new research and applications using NESDIS /partner data and products
> **Objective 1.3:** Demonstrate new/improved product and services in the user environment along with training

Objective 1.4: Collaborate with NOAA testbeds to support demonstration and transition of NESDIS operational and experimental products and PGRR advances in user applications

GOAL 2: Advance the impact of NESDIS current and future products

Objective 2.1: Enhance NESDIS current and future capabilities and innovate improved products and services through user feedback

Objective: 2.2: Quantify social impacts and return on investment

GOAL 3: Innovate satellite science applications

Objective 3.1: Understand the utility of satellite observations for emerging needs through Data Science and Analytics Discovery

Objective 3.2: Identify Emerging Applications benefiting underserved and vulnerable people annually

Objective 3.3: Establish an Innovation Initiative and identify Innovation focus areas annually

Objective 3.4 Establish an Innovation fund to accelerate exploratory, high-risk research

Scope of Activities

The NESDIS SPG is the research and innovation part of the NESDIS Products and Services (P&S) Portfolio, mapping current and planned capabilities to better serve user needs and develop solutions, and providing an environment for scientific experimentation/testing and demonstration. It maps to the NESDIS 5 year product management plan by providing a 5 year rolling science and innovation roadmap.

SPG focus is maximizing the benefits and performance of data, derived products and analyses derived from NESDIS and partner satellites combined with other potential information (e.g. ground based) for downstream operational and research users. SPG includes the following components: Proving Ground, Risk Reduction, and Science Analytics.

- Proving Ground (PG) focuses on “Fit for Purpose” and “P&S Innovation Demonstrations” (*RL 6). The Proving Ground component includes the demonstration and utilization of operational and research data products by end-users in NOAA’s LOs in their operational and/or research environments. The Proving Ground also identifies user feedback, readiness and training needs.

- Risk Reduction (RR) focuses on “P&S Innovation” the development of new research and applications *RL 2-5. It allows for testing alternative algorithms and developing new research and applications as well as the fusion of data/information from multiple satellites, models, and in-situ sources. It responds to specific user needs.

- SPG also involves Science / Analytics Discovery activities that are aimed at better understanding the utility of satellite observations/products along with other information for emerging needs. Data science produces broader insights that concentrate on which questions should be asked, while data analytics emphasizes discovering answers to questions being asked.

**Expanded descriptions of RLs are provided in the Planning section of this document.*

The SPG activities will follow the Proving Ground Initiative framework, which engages with users to make sure solutions work in their environment, and also demonstrates innovative solutions with users before making broader commitment for operational commitment.
Activities will be carried out through topic area initiatives. These activities should include steps such as users and developers exploring new applications together as outlined in the planning section of this document. Users also define their utilization plans/readiness for the products or services being developed.

SPG Initiatives are managed by facilitators who are responsible for establishing and maintaining an effective forum for the initiative project teams to interact, and facilitate communication between developers and users. Some initiatives have a Subject Matter Expert who along with the facilitators ensure that projects reflect NOAA's mission and utilize NESDIS data in ways that ultimately lead towards the demonstration of improved applications and where applicable, a pathway to operations. Each initiative has a senior member of the user communities they support. These senior members are the User Advocates of the particular initiative. User Advocates establish procedures to provide user feedback to the product development teams based on users' needs and expertise. User advocates along with the facilitator collaborate with appropriate operational managers and staff to determine the best research to operations pathway for proven initiative capabilities. The Principal Investigators (PIs) of the initiatives propose multi-year projects and define scope, goals, milestones, deliverables of their projects. They work with the initiative team to ensure their work is relevant to the user needs.

The focus areas of the initiatives are tied to NOAA mission science, services, stewardship priorities identified by NOAA Councils including NOAA Science Council, NOAA Ocean and Coast Council, NOAA Observing Systems Council, Integrated Weather Water Climate Board (Council) and by NOAA-wide Testbeds and Proving Grounds. SPG will provide an annually updated rolling five year science and innovation roadmap/user readiness plan by discipline based on existing NOAA user needs and input from NESDIS User Engagement Council. These 5 years roadmaps will be used to guide periodic Call for Proposals and will have a broad overview of current user readiness. A proposal driven peer reviewed process will be used to select projects and initiative areas.

The Satellite User Liaisons will provide leadership, satellite expertise, and support for SPG efforts based at different cooperative institutions or other NOAA line offices to further facilitate the applications of satellite products in other NOAA testbeds, proving grounds and at other

NOAA offices to foster understanding of user needs and co-develop solutions at the user facilities (e.g. NCEP centers, NOS/NMFs labs, etc). They will actively pursue the testing of new satellite products and decision aids.

Outreach activities will be conducted by Satellite User Liaisons and SPG Initiative Facilitators. Examples of outreach activities include Proving Ground Summits/Science Meetings, outreach to other testbeds to promote operational transitions in NOAA and other agencies.

Planning

The SPG will provide an annually updated rolling five year science and innovation roadmap/user readiness plan by discipline based on existing NOAA user needs and input from NESDIS User Engagement Council. These 5 years roadmaps will be used to guide Call for Proposals and will have a broad overview of current user readiness. Projects and initiative areas will be selected through a proposal driven peer reviewed process.

A successful initiative includes: users and developers exploring new applications together; dialog with other interested parties; collaboration among teams and projects within other initiatives that share common goals; and user engagement in new product development. The PG Initiative framework should be used to engage with users to make sure solutions work in their environment, and also demonstrate innovative solutions with users before making broader commitment for operational commitment.

NESDIS will follow a science based approach for product development decision making through a gated process shown in Figure 1. This will help determine which user driven product requests require innovation and research in SPG and which ones can directly go through the P&S process. This gated process is based on DOC Systems Engineering (SE) best practices.

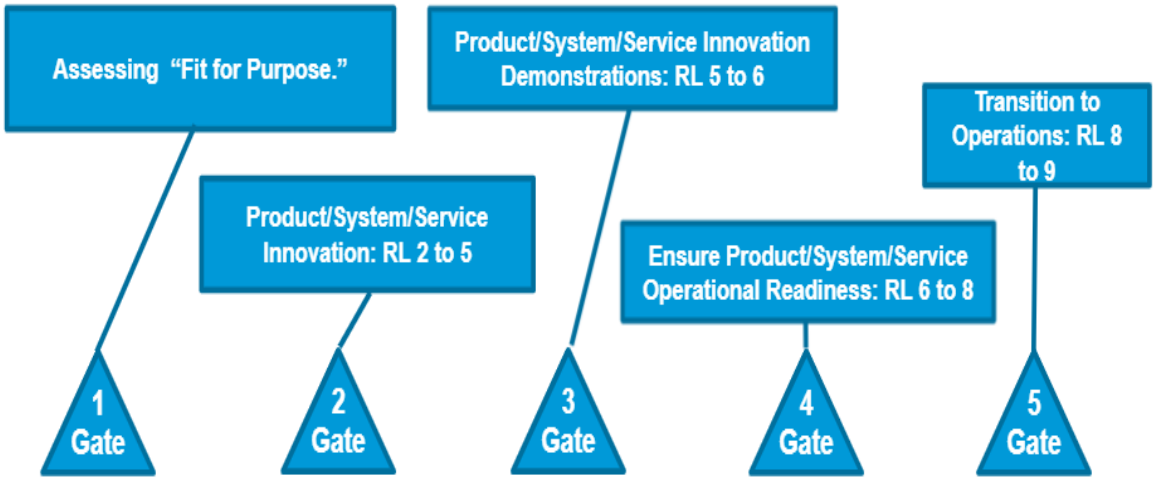

Figure 1: Science-Based Product Development Decision-Making Through a Gated Process, Following DOC SE Best Practices: NESDIS-PR-1300.1 Systems Engineering Procedural Requirements.

Gate 1 includes assessing "Fit for Purpose", Gate 2 represents Product/System/Service Innovation, Gate 3 is the demonstrations of the Innovation, Gate 4 ensures product/system/service operational readiness and finally Gate 5 is for transitioning to operations. SPGfalls under Gate 1-3 which spans from the review of NOAA mission priorities and user needs/readiness, identifying gaps in knowledge relevant to NOAA's mission to the readiness and eventual pathway to operations. In reference to NAO 216-105B: policy on research and development transitions, SPG funded projects goes through readiness level RL 2-6 where RL 2 Is "Applied Research", RL3 is proof of concepts for system, process, product, service, or tool, RL4 is successful evaluation of systems, subsystem, process, product, service, or tool in a laboratory or other experimental environment, RL5 is successful evaluation of system, subsystem process, product, service, or tool in relevant environment through testing and prototyping and RL 6 is demonstration of a prototype system, subsystem, process, product, service, or tool in relevant or test environment (potential demonstrated). Once the SPGprojects meet the exit criteria of Gate 3, the eligible projects are transferred to the PPMT where they go through Gate 4: Operational Readiness and Gate 5: Transition to Operations. PPMT ensures the readiness level RL 6-9 of the projects.

How Priorities are set in the NESDIS SPG

The SPG focus is maximizing the benefits and performance of data, derived products and analyses derived from NESDIS and partner satellites for downstream operational and research users. SPG addresses science innovation, mission impact, and user readiness. Science

priorities are tied to NOAA mission science, services, stewardship priorities identified by NOAA Councils including the NOAA Science Council, NOAA Ocean and Coast Council, NOAA Observing Systems Council, Integrated Weather Water Climate Board (Council) and by NOAA-wide Testbeds and Proving Grounds.

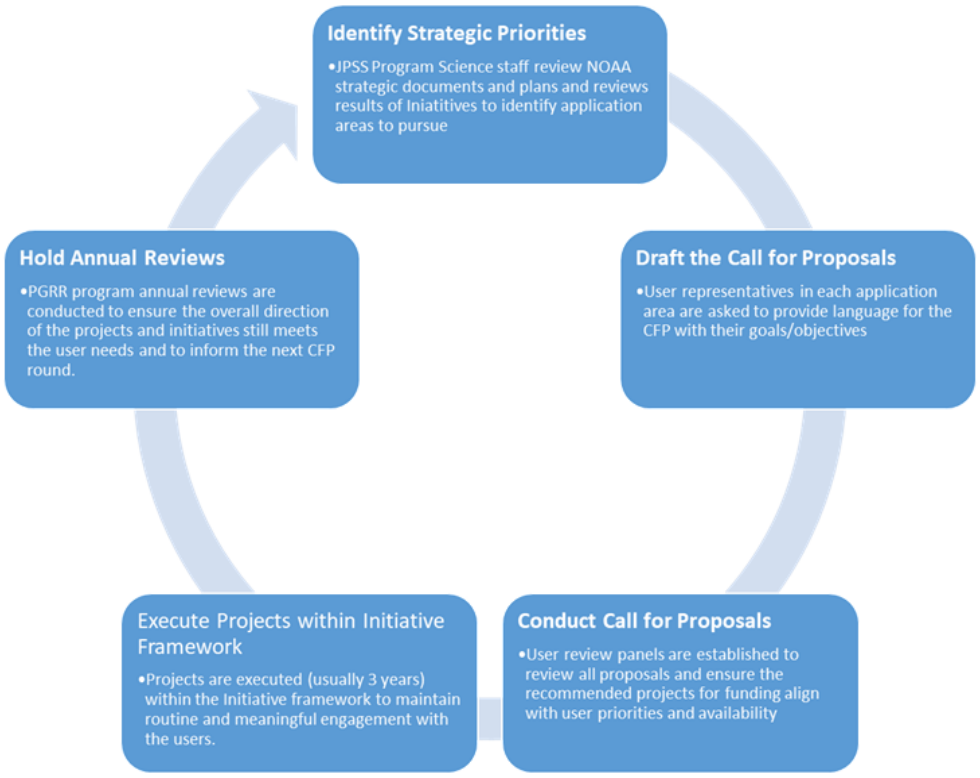

Figure 2: Planning cycle of the SPG, including the first step to identify strategic priorities as described in this section.

Governance

SPG Board (SPGB):

The Executive Board has two co-chairs: the NESDIS Senior Scientist and a two-year rotating co-chair from STAR, NCEI, LEO, and GEO-XO. EPGB members (NESDIS & NOAA LO reps) participate in the creation of the rolling five-year innovation/readiness roadmap, develop the formal call for PG and RR proposals, and conduct reviews of proposals received. The EPGB co-chairs will make their final decision on proposals based upon recommendations from the Board. The EPGB will be composed of NOAA federal personnel responsible for program execution, milestones, and deliverables. EPGB will be supported by the EPG management team which is matrixed from NESDIS and NOAA LOs. Thematic Committees and Working Groups may be created by the Board as needed.

Technical Advisory Group (TAG):
The TAG will be called on by the EPGB to provide subject matter expertise (SMEs) during the development of the innovation plan and for the proposal review process. The TAG is an advisory group to the Executive Board and does not hold voting privileges. The TAG will include SMEs from NOAA, CIs, partner agencies, and NOAA Council of Fellows, and will be chaired by a member of that Council.

Science Analytics Discovery Board (SADB):
The Science Analytics Discovery Board is chaired by the STAR and NCEI Directors or their designees. Science/Analytics discovery projects should be consistent with priorities identified in the rolling five-year innovation/readiness plan. Projects are selected by the STAR and NCEI directors or their designees with concurrence from the NESDIS Senior Scientist.

Summary

The SPG **ensures user engagement and user readiness in addition to ensuring that NOAA LOs and partners benefit from NESDIS' products and services in an expedited manner** through understanding user needs and their priorities, how our current products meet their needs, assessing existing and potential gaps, and assessing user readiness to use both current and proposed projects. The SPG promotes outreach and coordination of new products with the end users, incorporating their feedback for product improvements and encouraging innovative solutions.